

Correct Lubrication of *Indian Motorcycles*

Chief, Scout and Standard Models

Whether you get out of your Indian Motorcycle all the miles of trouble-free service, all the days of keen enjoyment that potentially we have built into it depends on you—*on your interest in its Correct Lubrication.*

We can tell you from ample experience that the service is there—and that from our standpoint we have taken every precaution to insure its fullest enjoyment to you. But whether or not you actually get this service depends not on us—not on what we have built into Indian Motorcycles—but on the continued presence of oil between the many parts which slide, or roll, one upon the other; on a thin film of oil, hardly ever thicker than a piece of paper—your safeguard against premature wear and troubles.

Since our motors are air cooled and depend largely on lubrication for cooling, we feel that close attention to the instructions and suggestions on proper lubrication outlined in this booklet will eliminate troubles and add materially to the life of Indian motors.

Read it—digest its information—and apply it; *get your money's worth out of your Indian!*

ABOUT LUBRICANTS

We could write volumes about oils—their quality—their tests—their sources; and when we got all done you would not be able to judge between them—for while there are differences in lubricants, such differences do not lend themselves to simple description; they cannot readily be expressed in figures or in tables or in other ways familiar to people who have not devoted much time to a study of oil technology.

CORRECT LUBRICATION

And so throughout this booklet we will leave theory to those who make it their business and will deal entirely with practical matters affecting the Correct Lubrication of Indian Motocycles.

From this purely practical standpoint, there are three essential things which you should know:

Lubrication Fundamentals

1. To get the best results, you must use a quality oil—you cannot maintain the necessary protective film unbroken and unimpaired in times of severe stress with an oil of doubtful quality.
2. Quality alone is not sufficient—some quality oils are of improper grade for the conditions met with in Indian engines; the oil used must be suited in body and character to the operating conditions met with in service.
3. Even a quality oil of the correct body and character will fail to give satisfactory service unless it is properly used—fed in the proper amounts—maintained in good condition.

Summary: To insure Correct Lubrication you must use a quality oil of grade suited to the engine and observe a few rules to feed it properly and keep it in proper condition.

OILS RECOMMENDED FOR INDIAN ENGINE LUBRICATION

Our part in this program of insuring Correct Lubrication to Indian Motorcycle users is to determine the quality and grades of lubricants that are best suited to the lubrication of Indian Motorcycle engines—and to safeguard a supply of these oils wherever Indian Motocycles are likely to be used.

INDIAN MOTORCYCLE OIL

We are supplying Indian dealers throughout the World with Indian Motorcycle Oil—a lubricant of superior quality—in three grades, Heavy, Special Heavy and Medium, for use as stipulated in the following table:

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	Summer				Winter			
Indian Chief	Indian	Oil	Heavy	Grade	Indian	Oil	Medium	Grade
Indian Standard	"	"	"	"	"	"	"	"
Indian Scout	"	"	Special Heavy Grade		"	"	"	"

Indian Oil is specially prepared for the lubrication of Indian Motorcycle engines and is available only through recognized Indian dealers. *We cannot urge too strongly that you confine your purchases of lubricants to Indian dealers—and use only Indian Oil as stipulated above insofar as is practicable.*

There will be times, however, when conditions make it impossible to obtain Indian Oil—and this is especially true abroad. So that you will not go astray on such occasions and use something totally unsuited for the lubrication of Indian Motorcycle engines, we recommend the use of Gargoyle Mobiloil in accordance with the following schedule:

	Summer				Winter			
Indian Chief	Gargoyle Mobiloil "B"				Gargoyle Mobiloil "A"			
Indian Standard	"	"	"B"		"	"	"A"	
Indian Scout	"	"	"BB"		"	"	"A"	

Gargoyle Mobiloil, like Indian Oil, is a superior product and our test work has indicated its entire suitability to Indian conditions when these recommendations are adhered to. It is, moreover, available the world over.

Thus, with Indian Oil available at all Indian agencies—and Gargoyle Mobiloil available at thousands of filling stations, garages and dealers wherever Indian Motorcycles are used, there need be no question concerning what oil to use. *Use Indian Oil as recommended wherever possible. Use Gargoyle Mobiloil as recommended when Indian Oil is not available.*

INDIAN SYSTEM OF LUBRICATION

The lubricating system is a "fresh oil" or "all loss" system—fresh oil from the oil tank is fed to the crankcase chamber by a positive, gear-driven plunger pump in accordance with the engine speed. The splash action of the fly-wheels which are housed in

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Indian Standard	"	"	"	"	"	"	"	"
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Indian Scout	"	"	"BB"	"	"	"A"

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In tropical climates when INDIAN oil, special heavy grade, or Gargoyle Mobiloil BB may not prove satisfactory with the INDIAN Scout, also wherever INDIAN oil special heavy grade or Gargoyle Mobiloil BB are not obtainable, *we recommend the use of INDIAN oil, heavy grade or Gargoyle Mobiloil B.*

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CORRECT LUBRICATION

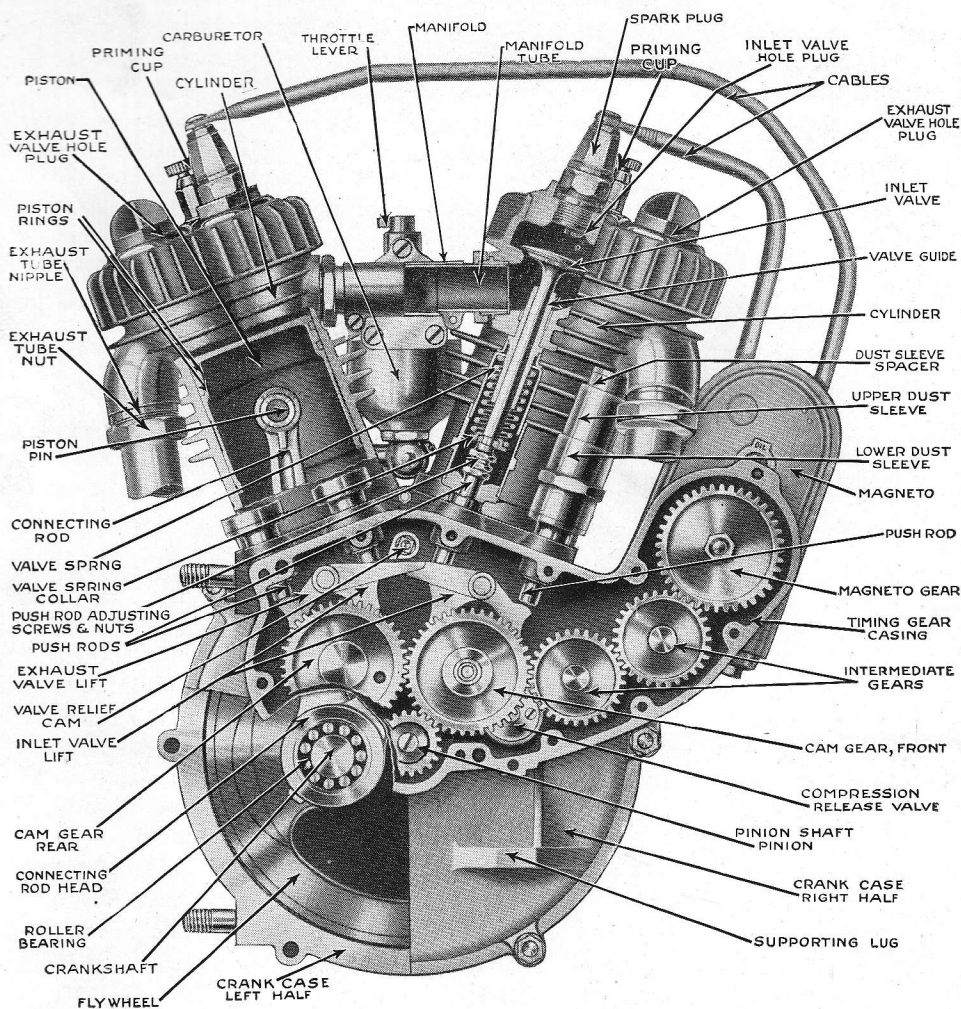


Figure 2—Sectional View of Scout Motor

the crankcase chamber distributes the oil in a fine spray to the cylinders, pistons and piston rings—and to the bearings and other engine parts requiring lubrication.

The oil supply which is fed by gravity to the mechanical oiler is carried in the front compartment of the fuel tank. Two oil lines

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lead down to the engine from the oil reservoir—one to the mechanical oiler driven by one of the timing gears on the right-hand side of the crankcase; and the other directly into the crankcase at the upper left hand side; this second oil line comes from the hand oil pump housed in the oil tank and provides a separate supplementary system of lubrication for emergency use in very heavy going.

On the Chief models the mechanical oiler forces the oil through an outside lead to the forward cylinder where it enters at the rear. On the Scout Model the mechanical oiler forces the oil through the outside lead to the motor base. The oil so introduced into the crank case chamber is caught up by the flywheel and distributed to the bearings, pistons, cylinders, cam case and other parts.

By arrangement of the holes in the baffle plates in the crankcase located at the bottom of the cylinders, piston rings and cylinder walls are supplied with the proper amount of oil which in turn is controlled by the crankcase oil level and by the grade of oil used.

The mechanical oiler is so adjusted when leaving the factory that it will supply slightly more oil than will be necessary after the machine has been run 500 miles. It will be noted that a rider should reduce the amount of oil supplied the motor for normal running after this mileage has been covered. Details on the proper adjustments for lubrication are covered in a later paragraph. The Indian Motorcycle engines are fitted with the mechanical oiler so that a constant supply of fresh oil is added to the crankcase supply to take the place of the oil that the motor consumes.

The auxiliary hand pump is used to add oil in extra amounts to the crankcase as required. Oftentimes, due to heavy side-car loads or high speed service, additional oil is required.

DETAILED LUBRICATION INSTRUCTIONS INDIAN MOTOCYCLE ENGINES

When the machine is new.

First: Fill the oil tank with the proper grade of Indian Motorcycle Oil.

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Never put oil in the gasoline tank, or gasoline in the oil tank. The tank in all models will hold slightly over three quarts. See that the oil is kept clean in transferring from the container to the oil tank.

Second: Prime the mechanical oiler to guard against an air lock after the engine has started. Remove the small bleed screw in the bottom of the mechanical oiler case (see Figure 3, Screw 5) and allow the oil from the tank to flow through the pipe to the pump for several seconds, thus clearing the line of air and properly priming the pump. Replace bleed screw tightly.

Third: Remove the oil level testing plug which is the upper of the two plugs located on the lower left hand side of the crankcase. Then pump two or three charges from the auxiliary hand pump located on top of the oil tank to raise the level until the supply of oil in the bottom of the crankcase flows out of the level testing hole. Replace level testing plug tightly.

Fourth: The engine is now ready to run; however, it is still new and stiff—it should be broken in with care. Do not race it for the first 500 miles—never race it idle. The hand pump should be used in addition to the mechanical oiler every 10 miles or more adding enough oil to the motor to keep it smoking lightly for the first 500 miles while breaking in.

CAUTION: Always keep an ample supply of the correct oil in the oil tank; should the tank go dry, stop immediately and replenish supply. Be sure and follow directions above for priming the mechanical oiler before starting engine after the oil tank has gone dry.

DRAINING AND CLEANING THE CRANKCASE

With the fresh oil lubricating system used on Indian engines dilution of the crankcase oil with fuel—a prevalent evil and source of danger on lubricating systems on automobiles—is not a factor on motorcycles.

The oil in service will acquire a certain amount of sediment, however, especially when the engine is new. There will be gritty matter, bits of carbon flaking from the undersides of the pistons,

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particles of metallic wear which must be cleansed from the crankcase periodically else they will be distributed with the oil, tending to increase friction and wear. So, every 500 miles:

First: Remove the drain plug in the lower left-hand side of the crankcase, allowing the old oil to drain off. It is best to do this while the engine is warm and the oil is thoroughly mixed; this will carry off most of the sediment.

Second: Replace the plug temporarily and force several hand pumps of oil into the crankcase. Run the engine for a few moments, and drain this off. If this oil is very much darkened in color, repeat this flushing process.

Third: After the crankcase has thoroughly drained, replace the drain plug tightly and remove the level testing plug. Then fill the crankcase to the proper level with the hand pump.

CAUTION: If the oil tank is emptied by flushing as described above, make sure to re-prime the mechanical oiler as described on Page 8 before starting the engine after refilling the oil tank.

Flushing with Kerosene: We do not advise flushing with kerosene. Its cutting action is so great that it loosens much sediment and gritty matter that is pocketed in the system and which is not normally circulated. When the engine is turned over with kerosene in the crankcase, this loosened matter is carried directly into the bearings, starting pitting and scoring.

Flush with the regular engine oil or flushing oil—it will carry off all the *loose sediment*—the attached sediment is out of circulation and is no longer harmful—*do not loosen it and carry it into your bearings with kerosene.*

CARBON DEPOSIT

It is a most natural thing to blame all the carbon faults on the oil—good, bad or indifferent, its the oil that's at fault.

But is it? Let us look into it a bit. It is essential that we get *some* oil above the pistons. If we got none—if the rings formed a positive stop—damage would result to the piston rings and cylinder wall!

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So we must pass some—enough oil to lubricate but not enough to “oil pump.”

The margin between the two conditions is a narrow one. For instance, idle a motorcycle engine at the curb for a while—then open the throttle—and for a moment or two it will smoke. Drive the same machine along the road at 30 to 35 miles per hour and the exhaust will be as clean as a whistle. Under *idling* conditions it is an “oil pumper”; under *normal loading* it is just a properly lubricated engine.

What's the difference?—just a difference in combustion chamber temperature. At low throttle there is not enough heat to burn clean the amount of oil drawn into the combustion chambers—under load with increased temperatures, we attain clean burning.

Unfortunately, there is no such thing as a “carbon free” oil. All mineral lubricating oils are combinations in varying amounts and forms of hydrogen and carbon and are grouped under the general term “hydrocarbon”; and the gasoline we use is similar, but simpler in structure.

This, then, brings us to the point—how to avoid “oil pumping” and carbon deposit.

First: Use nothing but the highest quality oil of the body and character exactly suited to your engine. We strongly urge that you stick to the use of Indian Motorcycle Oil as recommended on Page 5.

Second: Be sure that the mechanical oiler adjustment is exactly right—see directions for adjustment elsewhere in this book.

Third: Use the auxiliary hand pump sparingly—only in starting or occasionally when the engine is worked on full throttle or in low or second gear in hard going.

Fourth: If the instructions on maintenance are carried out, you can expect many thousands of miles of service before noticeable cylinder wall and piston wear takes place.

When such wear occurs, have cylinders reground and over-size pistons fitted.

Do not attempt to compensate for wear by using a heavier bodied oil than has been recommended. An over supply of heavy bodied lubricant is the most frequent cause of fouling

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spark plugs—sticking valves—excessive carbon formation—and “carbon knock” or pre-ignition. Avoid it.

Fifth: Be sure that your carburetor is properly adjusted. You cannot expect the flame of combustion to burn clean the oil normally reaching the combustion chamber if the mixture is so rich that there is not enough air to consume all the fuel! With a rich mixture carbon forms from the incomplete combustion of both oil and gasoline.

Sixth: “Missing” promotes both oil pumping and carbon formation. Therefore, keep the magneto clean and in perfect adjustment; and see to it that the spark plugs are in good condition, clean and the gaps perfectly adjusted.

Seventh: Compression losses lower the efficiency of combustion and the ability of the burning fuel charge to dispose of excess oil. Therefore keep the valves properly ground in—the tappets properly adjusted—and the pet cocks and cylinder head gaskets tight—and use the grade or grades of oil

recommended to insure proper sealing of the piston rings against compression losses.

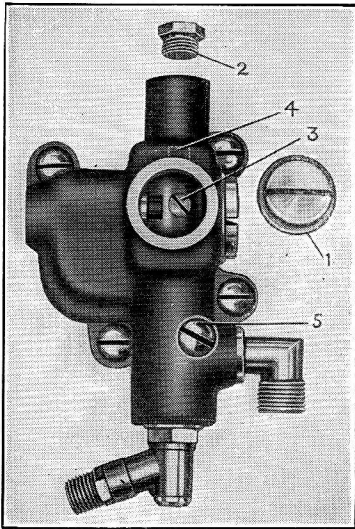


Figure 3—Adjustment of Mechanical Oiler

ADJUSTMENT OF THE INDIAN MECHANICAL OILER

The mechanical oiler is properly adjusted at the factory before the machine is shipped to care for the oil supply while the motor is new. This adjustment may require resetting after the machine has been operated 500 miles.

If the nature of the country where the motorcycle is used is such that a re-adjustment of the oil feed is necessary, proceed as follows:

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First: Remove caps 1 and 2 (Figure 3) and loosen, but do not remove screw 3.

Second: If it is necessary to increase the oil feed, turn plunger screw 4 to the right (clockwise) not more than half a turn. Tighten screw 3, replace caps 1 and 2 and test machine to see if adjustment is correct. Repeat if necessary.

Third: If it is necessary to reduce the oil feed, follow above, except that screw 4 should be turned over to the left (anti-clockwise) instead of to the right.

Note: The oil feed is proper when in normal driving a very slight blue haze is noticeable at the exhaust and the oil level is maintained at the proper point in the crankcase.

The oil feed is below normal when it is necessary to use the auxiliary hand pump to maintain the proper crankcase level in normal service.

The oil feed is excessive when the engine smokes profusely and continuously in normal service and there is a tendency for the crankcase level to build up—the spark plugs to foul—the engine to act sluggish—and carbon to accumulate.

PRIMARY DRIVE HOUSING EMBRACING DRIVE GEARS, CLUTCH AND TRANSMISSION GEARS

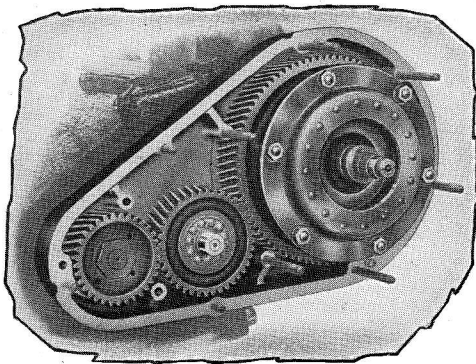


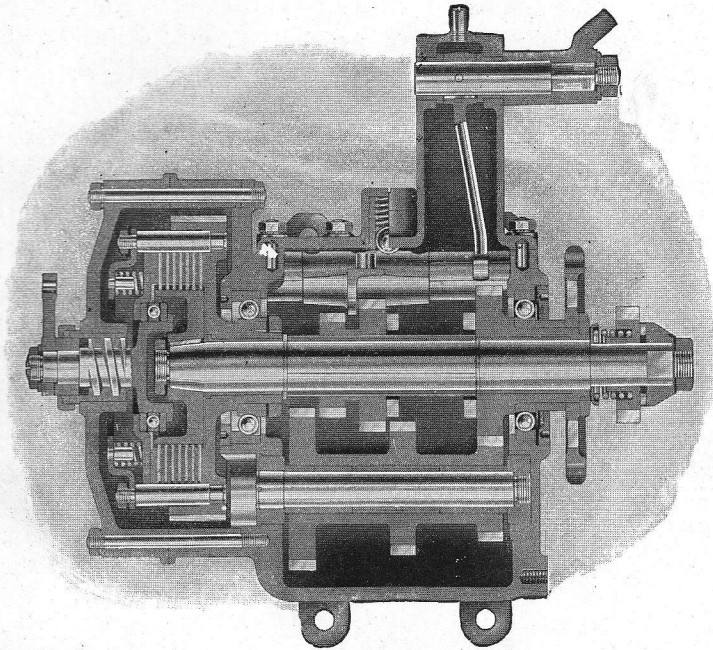
Figure 4—Primary Drive.

ler and ball bearings transmits the power developed; these gears operate in an oil bath.

On the Indian Chief and Scout models the engine and transmission are combined in one sturdy compact unit which represents the most modern and efficient design in motorcycle manufacture. This eliminates the use of the short chain, which has been used in the past to transmit the power from the engine to the counter shaft. In place of the short chain a system of three spiral gears carried on roller and ball bearings transmits the power developed; these gears operate in an oil bath.

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The clutch used is of the multiple disc type, using alternate steel and Raybestos faced discs, and operates in a bath of oil. The thrust is carried by two sets of ball bearings, and the correct clutch tension is controlled by a number of coil springs.



*Figure 5—Cross Section of Transmission and Clutch
Showing Assembly of Component Parts*

LUBRICATION OF TRANSMISSION UNITS

The primary drive housing is oil tight and carries the lubricant for the main drive gears, the clutch and the transmission gears. This unit is filled when the machines leave the factory, but it is best to check up on the oil supply before putting the new machine into service.

To Fill—Remove the filling and level testing plugs and pour in the proper brand and grade of oil until it begins to overflow through level testing hole.

CORRECT LUBRICATION

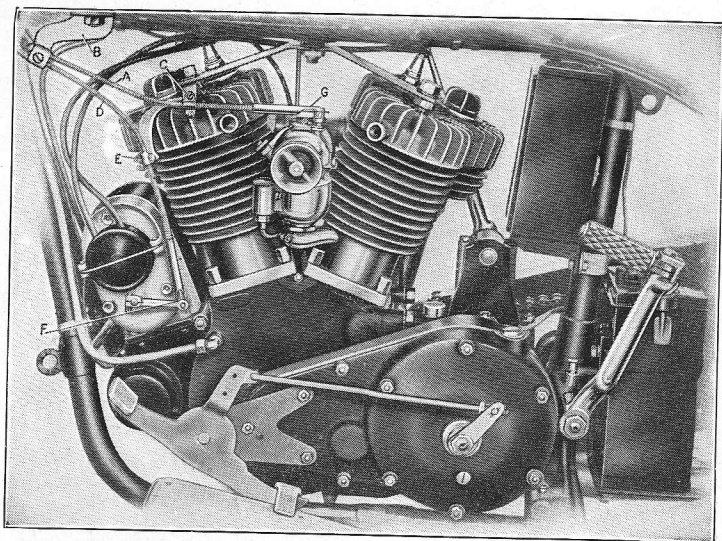


Figure 6—View of Indian Unit Power Plant, Drive Side.

We recommend Indian Oil Medium during summer weather or Gargoyle Mobiloil "A." During winter weather—when you change to the winter engine oil—use Gargoyle Mobiloil Arctic in the primary drive housing.

Caution: Do not fill this primary drive housing with heavy oil. It will cause the clutch to slip. Under no circumstances should grease, graphite or non-fluid oils be used in this unit!

In very cold weather, the oil lubricating the clutch may have a tendency to thicken when the motor has been cold for some time. This tends to make the clutch "drag" when gears are shifted. However, as soon as the motor warms up, the oil will thin down to its usual consistency and the clutch will act normally.

WHEN TO REPLENISH TRANSMISSION OIL SUPPLY

The oil in the transmission and primary drive cases should be checked for level every 500 miles and if necessary oil should be

TRANSMISSION LUBRICATION

of

Indian Prince Model



TO FILL

Remove the level and filler screw (upper screw) on the right hand side of the case and fill (until level reaches the bottom of hole) with Indian Oil Special Heavy, or, if this is not available Gargoyle Mobiloil "BB".

TO DRAIN AND REFILL

First: Remove the drain screw (lower screw) on the right side of the transmission case and drain off old oil. Tilting the machine over on its right side facilitates draining. Remove filler screw and flush with a light bodied oil.

CAUTION—Do not use kerosene for flushing. The drain hole is so located that some kerosene may be trapped in the case which will dilute the fresh supply of oil.

Second: After filling to the proper level with the recommended brand and grade of oil, replace filler screw tightly.